INTERVIEWS OF GEORGIA WATER RESOURCES SCIENTISTS AND MANAGERS

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Abstract: Federal and state legislation requires Source Water Assessment and Protection Plans, Watershed Assessments, and Total Maximum Daily Loads. Georgia water resource professionals need tools to implement these legal mandates, educate the public, allocate resources, and plan for the future. BASINS is an environmental analysis system created by EPA for TMDL development. A masters thesis conducted by the first author explores issues involved with coupling spatial analysis with hydrologic modeling. The thesis evaluates the use of BASINS in Georgia based on criteria selected from federal and state legislation, and from interviews with federal, state, and local water resource professionals. Trial simulations are run to compare modeling over a range of watershed sizes, to examine issues of importing data, and to examine how BASINS can support several legal directives. A brief summary of the interviews is presented here.

METHODS

Water resource scientists and managers were consulted for their professional views on the current water resources concerns in Georgia. The opinions documented are those of the interviewees, not the agencies they represent. Twenty interviewees were identified by referral from water resources professionals, agency listings, and interviewees themselves. The agency or group interviewed and the number of interviews are included in Table 1.

Interviews were conducted to identify key issues in watershed management, not to gain a representative random sample of Georgia public opinion. The approach was qualitative with time for in-depth discussion. Conducting a representative survey was entirely outside the scope of this project; however, the key objectives identified may be useful in guiding future avenues of research. The sample was purposive; there was a specific purpose for the people included in the interviews.

Table 1.
Interviews of Natural Resources Agencies and Groups Related to Water Resources Management

Agency/Group	#
UGA Crop & Soil Science	1
UGA School of Environmental Design	1
UGA Institute of Government	1
Oconee River Land Trust	1
Georgia Farmers	3
Georgia Legal Watch	2
GA Soil & Water Conservation Comm.	1
GA Pollution Prevention Assistance Div.	1
GA Environmental Protection Division	2
U. S. Agricultural Research Service	2
U.S. Environmental Protection Agency	1
U.S. Geological Survey	2
U.S. Natural Resources Conservation Service	2

Three general questions were asked over about one to two hours. General questions were followed by specific questions depending on the area of expertise, interest of the interviewee, and direction of the conversation. Specific questions were derived from the following general ones:

1 What do you think the critical concerns and needs are in Georgia water resources management? A) Are we limited more by scientific knowledge or by implementation? B) Are laws or education/incentives more effective? C) What do you think about TMDLs? D) What policy changes are needed? E) What are the sources of water quality concerns? F) What issues do you see regarding

data, e.g. comparability, sharing, monitoring needs, etc.? G) What role can predictive models play?
2 How do you see a tool like BASINS being used?
3 What would you want to know about BASINS before you would feel comfortable using it to make decisions?

INTERVIEW RESPONSES

Responses were summarized into four categories: policy, science, land-use sectors, and models. The summaries presented here are general overviews. A thesis by the first author will present an extensive report of the interview responses. This section includes the opinions of the interviewees, not the authors. The discussion section includes comments on the responses.

Policy

Respondents discussed a range of policy concerns, from issues of tax-driven development, to scientific knowledge vacancies in TMDL development, to a paucity of federal money for demonstration projects. Most topics were derived from the relationship between land-use and water quality. For example, development increases the amount of impervious area in a watershed and converts streams into engineered stormwater conveyances. TMDL implementation involves identifying sources of pollutants and allocating pollution among users in a watershed. Demonstration projects can show methods of sustainable development, agriculture, and forestry. These examples, along with most of the issues raised, were various reflections of land-use management concerns.

Respondents viewed land-use management and planning as a leading and growing threat, as well as a potential anodyne, to water quality in Georgia. They recognized the dilemmas that develop as economic health is poised against environmental health in a political landscape. Communities can govern land use management through local zoning and land management ordinances, deciding what, where, and how development occurs. Many interviewees recognized that local government leaders often meet resistance to land management ordinances from developers and landowners, bidding land use planning interests against strategies for re-election. Many interviewees felt that most local leaders have not yet developed the vibrant political will, regarding water resources, that is necessary to invoke change. Respondents felt that the role of scientific and regulatory agencies in local watershed planning should be to supply information and technical tools that support state and local decision making.

Interviewees believed that Total Maximum Daily Loads (TMDLs) are a good attempt at site specific solutions and at accounting for non-point sources. However, the division of the watershed into arbitrary segments and the lack of scientific knowledge about hydrologic processes caused many respondents to question the wisdom of the TMDL program. Interviewees felt that the investment of limited time and financial resources into comprehensive watershed management approaches that address the political, economic, financial, transportation, as well as the scientific landscape of the watershed may be more beneficial. One of the farmers summed up the issues well when he said, The management plan is key. When you have a regulation here and a rule there, you don't have a plan. You have a mess.

Respondents suggested a range of policy solutions, from economic incentives to enhanced local ordinances with improved enforcement. Respondents felt that economic incentives were appropriate for agriculture and forestry, since farmers have a relationship with and a stake in the land, but laws with enforcement were needed to address the transient nature of development. State agency respondents believed that landowners are willing to support Best Management Practices if the costs are distributed among the beneficiaries. Interviewees saw the future of watershed management in coordinated planning, alternatives to the conventional reductionist approach to resource management, and citizen driven decisions.

Science

The interviewees believed that scientific understanding can promote better decision-making, and indicated that many water resources issues cannot be addressed well due to a lack of scientific knowledge. For example, the effectiveness of Best Management Practices and Nutrient Management Plans are not clear, and the science of pollutant source identification and in-stream flow minimums are in development. Many respondents emphasized the need for long-term monitoring, and commented that national standardized methods would allow data comparability among agencies.

Land-use Sectors

Human resistance to change was a theme that echoed throughout many of the interviews. Respondents felt that adherence to the status quo, along with degrading urban infrastructures were leading causes of impaired urban streams. Several interviewees held concerns for current development patterns that result in inefficient use of urban infrastructure, and felt that development could be improved through innovative techniques.

Several respondents articulated that well-managed agricultural and forest lands benefit the entire community by providing food and forest products, clean air and water, and green space. Many interviewees suggested that the implementation costs of Best Management Practices should be paid by all beneficiaries, not only the farmer. One interviewed farmer stressed the need for regulations that are stable and scientifically based, not politically driven. A view held by many respondents was that agricultural and forestry non-point source pollution should be managed through economic incentives in the form of cost-share programs and pollution trading.

Modeling

Respondents emphasized that models are simplifications of reality, with assumptions, and approximations. Interviewees accentuated the point that models should not be viewed as the sole provider of answers to complex questions. State agency participants identified their need for simple, quick, user-friendly models that help people visualize the impact of various decisions. There was no consensus regarding the effect that modeling has on decision-making, such as whether varied model output will result in unique policy strategies. A state agency participant asked a meaningful question, "if a model calls for a 50% or a 75% reduction in fecal coliform loading, will we do anything differently?"

Respondents viewed BASINS as potentially useful for watershed management through characterization and education, but not for the generation of absolute values. Primary concerns over BASINS included issues of user-friendliness, data quality and comparability, parameterization, and the lack of experimental data.

DISCUSSION AND CONCLUSIONS

Abundant conflicting interests, intense economic and political pressures, and prosaic political will inadvertently conspire to degrade water resources. These themes resonated throughout the interviews, as respondents ebbed and flowed from subjects of policy and community involvement to issues of insufficient scientific understanding. One of the farmers summed up the issues well when he said, "...if you have a high concentration of chickens, and urban growth, and you are cutting your buffers, something has to give...". These issues, including public, economic, and environmental health culminate at the community level, placing local leaders and citizens at the helm of water resources issues. The citizens will decide what will 'give' in local planning commission meetings across the United States where they will have to make decisions regarding land-use and management. Decision making will be enhanced if current scientific understanding is felicitously conveyed to the local leaders and stakeholders. Joshua Ledbetter, of Rockefeller University said:

> "The scientific mind can bring much to the political process. But science and politics are a hard match. Truth is the imperative of science; it is not always the first goal of political affairs...A vital responsibility of the expert advisor is to clarify technical issues so that the essential policy questions become accessible to the judgement of the community at large..." (Robert Wood Johnson Foundation 1995).

Scientific information is conveyed through technical and decision-support tools, which are also used by the local planners to implement legal and policy directives. The technical tools being produced by federal agencies must meet the needs of the users, including user-friendliness and defensibility. For example, hydrologic models, that are being used for watershed assessments and TMDL development, must have realistic data and parameterization requirements, and should be legally and scientifically defensible. Some of the legal directives, including TMDLs, will be challenged in court when they cause considerable impact upon landowners. The technical tools provided should stand up to the legal and scientific challenges.

Regardless of the technical tools that are utilized, public support is necessary for successful implementation of local ordinances, including watershed management plans. Scientists must be able to communicate the knowledge gained from data and analysis, as well as, the limitations of the data and analysis, in order to maintain the trust of the public. One respondent made a simple, and often overlooked point; "In the end, planning is a public process, not a scientific one." Diminishing the gulf between policy, science, and the public requires the input of people with technical knowledge, as well as, political insight.

LITERATURE CITED

Robert Wood Johnson Foundation. 1995. Community risk profiles. A tool to improve environment and community health. Ed. I.K. Wernick. Program for the Human Environment. The Rockefeller University.